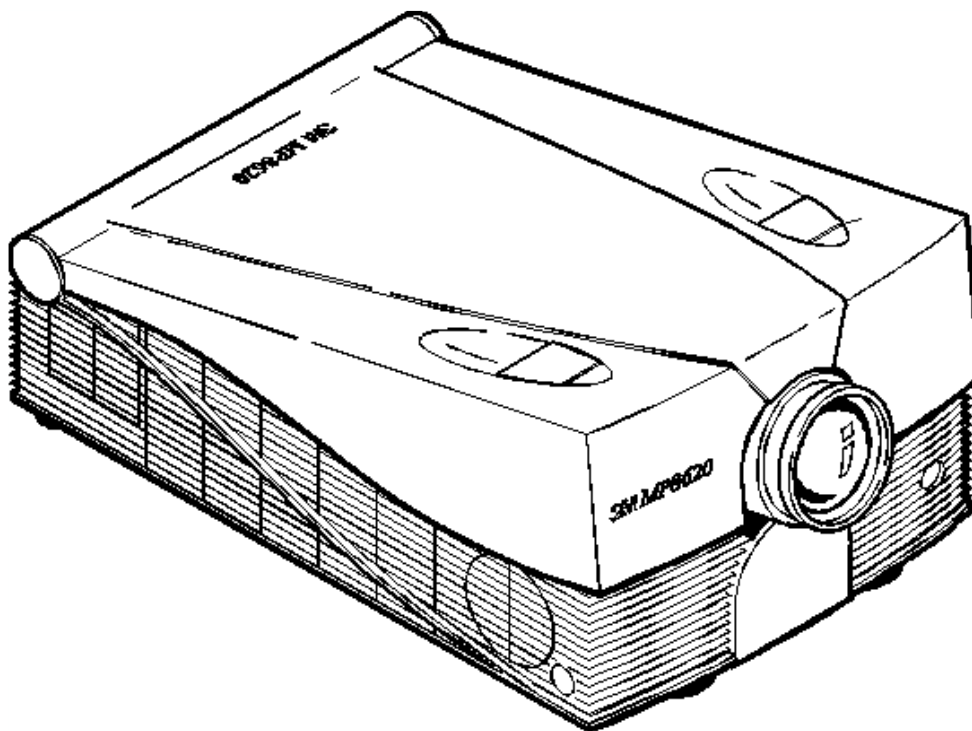




MP8620 Multimedia Projector

Service Manual



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1. Adjustments

1-1. Overview

Make advanced adjustments to the MP8620 in a clean environment with minimal dust and positive pressure. This section provides the advanced adjustment procedures needed to maintain a high quality projection image. There is a specific order that adjustments are to be made and specific tools needed to complete each adjustment.

√ Important Note

Important: Complete advanced adjustments to a projector only when the machine settings fall outside of the allowable tolerances for that adjustment, or when instructed to do so by another procedure.

1-2. Static Control

The circuit boards in the MP8620 are very sensitive to static energy. A simple static charge can ruin a circuit board instantly. Because of this, it is essential that you complete all repairs in a static-safe work environment.

1-2-1. Static-Safe Work Environment

A properly grounded floor mat, table mat and adjustable wrist strap with grounding cord are needed for complete static protection.

3M recommends any of the following workstation grounding kits:

- 3M™ Workstation Grounding Kit Model 8011
- 3M™ Workstation Grounding Kit Series 8020
- 3M™ Workstation Grounding Kit Series 8030

For your nearest distributor or to order, call 1-800-328-1368.

1-3. Machine Identification

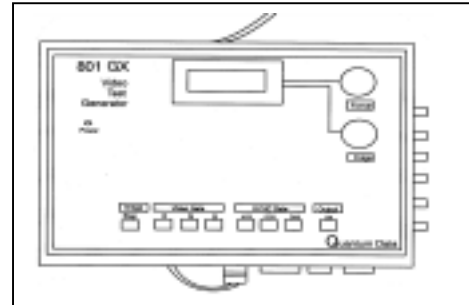
To avoid incorrect adjustments, verify the model and version of the projector prior to making any adjustments. Different versions have unique adjustment requirements. The serial number for MP8620 is located on the back of the projector.

1-4. Technician Tools

Test Generator: 3M recommends the Quantum Data™ 801GX Video Test Generator (*shown to right*) or Extron™ VTG200 Video Test Generator be used for all advanced adjustment procedures. Use to input a test pattern prior to adjustments.

External Power Supply: Used to check the audio interface PCB's.

Service Interface Cable: Used to connect the original disassembled power supply with the interface board.



LCD Alignment Tool: Used to check that the LCD alignment is at an 8 degree angle.

Backlight Light Source: Used to check the disassembled LCD unit without the original machine lamp source.

Voltmeter: Used to measure the voltage at particular test points. 3M recommends the Fluke™ model 87

Oscilloscope (100 MHz): Used to check the video signals horizontal and vertical synchronization and the video board clock.

Torx Drivers: Use to remove mounting bolts.

White Silk Gloves: Used to keep skin oils away from the lamp and LCD panel.

1-5. Return to Default Settings

1. Power down the projector and turn the main power switch to off.

Press and hold both the **Enter** button and the **Down Arrow** button on the control panel

2. Turn the main power switch to on. The default settings are restored and the following message appears:
Parameter Factory Settings Restored.

Resetting a projector to its default factory setting may resolve a “no input detected” error message for an RGB or video input device.

1-6. Cleaning the LCD Panel

Dust particles can accumulate on the glass covering the LCD panel causing spots on the projection image. Periodic cleaning is necessary to maintain a high quality projection image.

1-6-1. Checking for Dust

Test for dust on the LCD panel by projecting a white image:

3. With the projector off, plug in the video test generator to an RGB terminal jack located on the back side of the MP8620.
4. Use the video test generator to input the color White with a timing signal set to SVGA VESA (60).

√ **Note**

The voltage settings for each input color need to be programmed into the video test generator. Refer to the video test generator user's guide for further assistance.

5. Turn the main power switch to the on position.
6. Look for dust particles on the projection image.

√ **Note**

Remove any dust from the outside of the projection lens with a lint-free cloth. If dust remains on the projection image, the LCD panel needs to be cleaned.

1-6-2. Cleaning the Dust from LCD

If dust particles can be seen on your projection image:

1. Turn off the main power switch of the projector and unplug the power cord.
2. Remove the LCD module assembly. (Refer to the appropriate Disassembly/Reassembly procedures).
3. Use a dust blower or compressed air to blow air on the LCD panel. Do not exceed 40 PSI.
4. If dust is still visible wipe the LCD panel with a chamois swab or a lint-free cloth from the 3M LCD cleaning kit.

√ **Note**

Use extreme care when cleaning any optics device. Special gelatin coatings can be scratched very easily.

5. Use a lighted magnifier with a black background to check for streaks.
6. Replace the LCD panel, reassemble the projector and recheck the projection image for dust by projecting a blank white image.
7. If dust still remains complete steps 1-6 again. If dust is gone, complete a LCD panel alignment.

1-7. LCD Panel Alignment

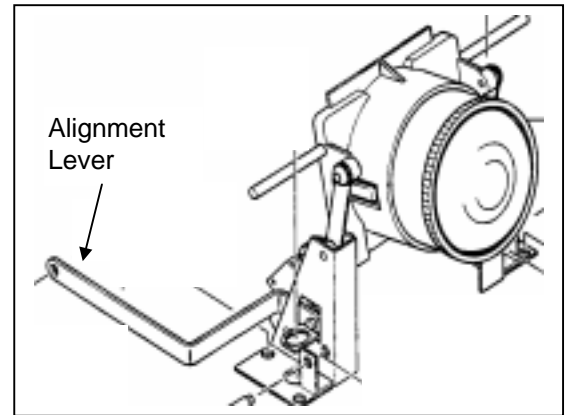
Periodic LCD panel alignment is necessary to maintain a high quality projection image.

1-7-1. LCD Verification and Alignment

Use the LCD Alignment tool (DY-0205-1508-5) to verify the 8° angle of the LCD unit.

1. Measure the angle between the bottom and the assembly surface of the LCD on the linkage side.
2. If the angle is not 8°, reform the alignment lever to obtain the proper 8° setting.

It may be needed to readjust the microswitch which is in contact with to the LCD unit. This switch has to be activated when the LCD is at the 8° angle.



1-7-2. LCD Ribbon Cable Installation

Installing a new LCD ribbon cable is done using the following steps:

1. Gently pull out the white plastic clamp on the LCD and interface board connectors to release the LCD ribbon cable.
2. Insert one end of the new ribbon cable into the LCD connector. The blue side of the cable should be facing up.
3. Insert the other end of the new ribbon cable into the interface board connector. The blue side of the cable should be facing down.
4. Lock the white plastic clamps into place on both the LCD connector and the interface board connector.
5. Use the old cable as a pattern to place the appropriate bends in the new cable.

If a connector clamp is broken:

1. Order a complete connector (DY-0205-1512-7).
2. Remove the plastic portion from the new connector and replace the broken part.
3. If the connector can not be repaired in this way, the LCD or interface board may need to be replaced.

1-7-3. LCD Ribbon Cable Installation

Installing a new LCD ribbon cable is done using the following steps:

1. Gently pull out the white plastic clamp on the LCD and Interface board connectors to release the LCD ribbon cable.
2. Insert one end of the new ribbon cable into the LCD connector. The blue side of the cable should be facing up.
3. Insert the other end of the new ribbon cable into the interface board connector. The blue side of the cable should be facing down.
4. Lock the white plastic clamps into place on both the LCD connector and the Interface board connector.
5. Use the old cable as a pattern to place the appropriate bends in the new cable.

If a connector clamp is broken:

Order a complete connector (DY-0205-1512-7).

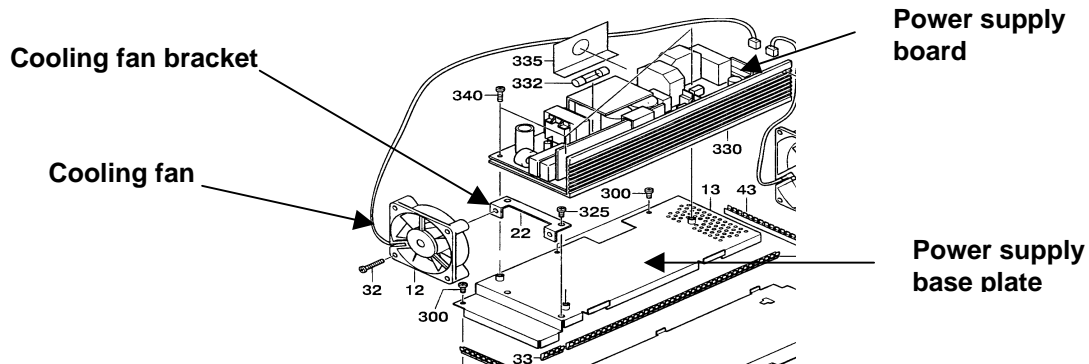
Remove the plastic portion from the new connector and replace the broken part.

If the connector can not be repaired in this way, the LCD or interface board may need to be replaced.

1-8. Interface/Audio Board Synchronization

The interface board or the audio board must be in sync. If either one or both are changed, complete the synchronization procedure.

1. Remove the power supply board using the procedure listed in the Disassembly/Reassembly section.
2. Remove the cooling fan and bracket by removing the two screws.
3. Remove three additional screws on the power supply base plate.
4. Tip up the base plate toward the lamp housing to remove it.

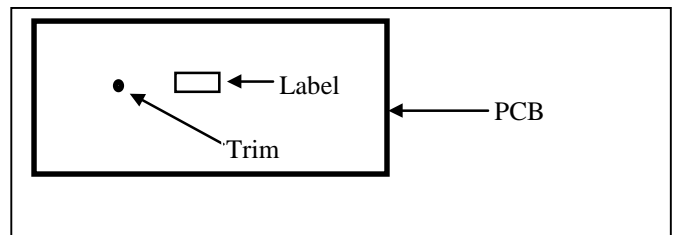
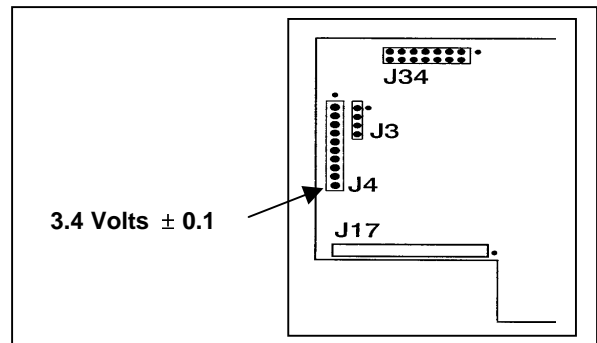


5. Reconnect the power supply to the machine with the 3-pin connector, or reconnect the external power supply (DY-0205-1509-3) to the machine with the 3-pin connector.
6. Connect the interface board to the power board with the Service Interface Cable (DY-205-1500-1).
7. Place a cover over the power supply board to prevent damage or injury.

Because the power supply board is fully energized in the next step, it is essential that a cover is placed over the board to prevent injury.

8. Power up the projector.
9. Measure the voltage of pin 9 on the test block. This connector is nearest the EPROM. Pin 1 is closest to the EPROM. The voltage should be 3.4 Volts \pm .01.
10. If the voltage reading of pin 9 on the test block is outside the allowable tolerance, adjust the trim potentiometer located in a small hole in the audio board until the voltage reading is within tolerance.
11. When finished with the adjustment, reassemble the projector.

Use extra care when replacing the power supply base plate, the LCD cable can be damaged very easily.

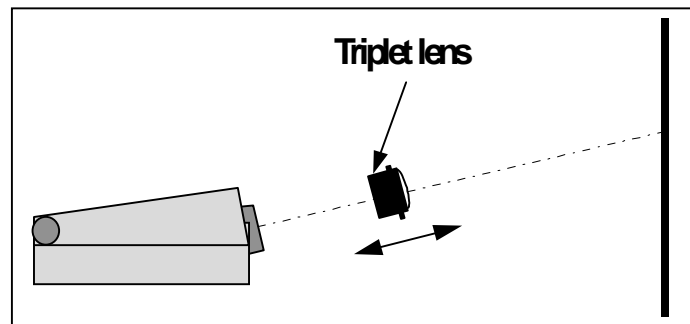
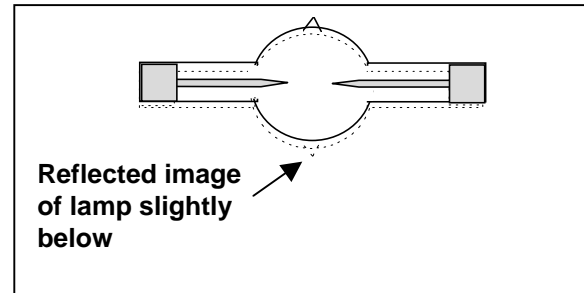


1-9. Lamp Alignment

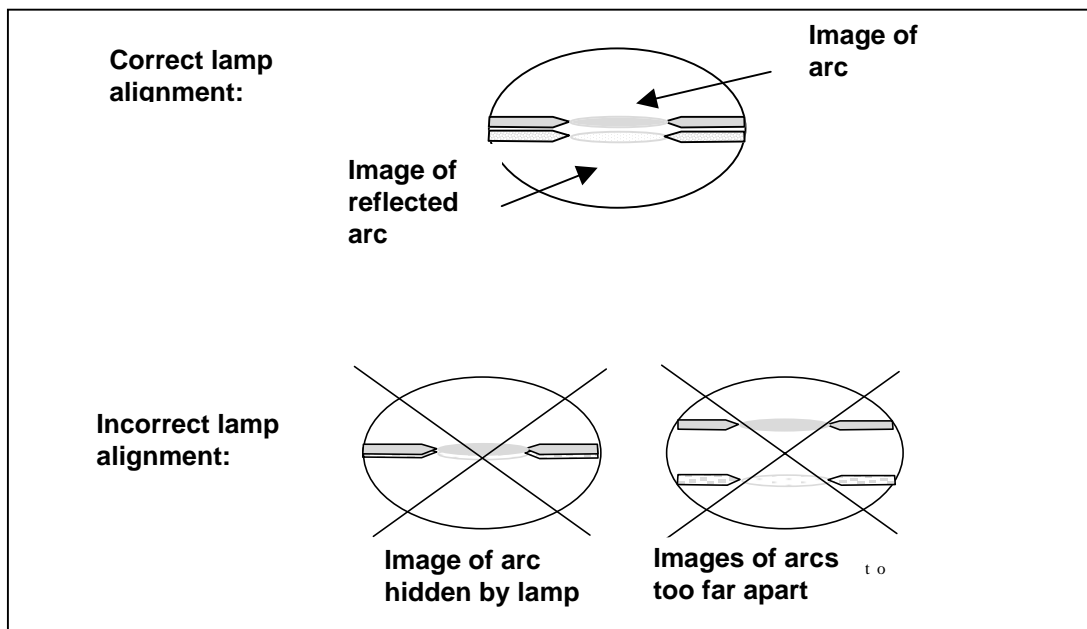
A poorly aligned lamp can reduce the brightness or the uniformity of the projection image. To ensure that the projector is producing the best possible image lamp alignment should be checked regularly.

1-9-1. Check the Lamp Alignment

1. With the projector off, remove the lamp assembly using the procedure listed in the Disassembly/Reassembly section.
2. Hold the lamp assembly and look through the condenser at an angle perpendicular to the condenser lens.
3. The lamp should be aligned using the reflection image on the lamp reflector. The image of the lamp should be slightly above or slightly below the lamp.
4. If not, this position can be changed by turning the two adjustment screws below the lamp sockets.
5. Verify the lamp alignment by powering up the projector and viewing the image of the lamp on the screen. This can be done by holding a triplet lens in front of the projector lens.



6. Visually check to make sure the image of the lamp arc is positioned correctly:



1-9-2. Align the Lamp

1. With the projector off, adjust the lamp up or down by turning the two adjustment screws mounted on springs under the lamp socket.

√ Note

If the arcs are too close, the lumen output will be reduced. If the arcs are too far apart the image uniformity will be affected.

2. Verify the lamp alignment by powering up the projector and viewing the image of the lamp on the screen by holding a triplet lens in front of the projector lens.
3. Repeat the above two steps until the lamp is aligned correctly.

1-10. Timer Information

A lamp life indicator is located under the Option sub-menu. If the indicator bar for the sub-menu item Lamp is Green the lamp is good. When the bar turns red or the projection image appears dark, the lamp and air filter should be replaced.

1-10-1.Reset the Lamp Life Indicator

1. Under the **Option** sub-menu select the sub-menu item Lamp and press **Enter**.
4. Follow the instructions in the Help Window.
5. Press the **Enter** button and the **Up Arrow** button on the control panel for confirmation.

1-11. Image Adjustments

1-11-1. Adjusting the display resolution and brightness and contrast.

1. Display the PC (RGB) input device projection image.
6. Boot up Microsoft Windows. Go to Control Panel and adjust the desktop background to an even black-and-white raster. Or, display a projection image with black and white colors.
7. Press the **Menu** button on the projector to display the main menu.
8. Press the up/down **Arrow** buttons on the projector or the **Control Stick** on the remote control up/down to highlight the **Setup** sub-menu.
9. Press the **Enter** button to select the **Setup** sub-menu. The current display resolution is displayed in the title block of the **Setup** menu. For example 640 x 480. Change the display resolution if desired.
10. Confirm your selection by pressing the **Enter** button.
11. Press the up/down **Arrow** buttons on the projector or move the **Control Stick** on the remote control to select the **Palette** sub-menu item.
12. Press the left/right **Arrow** buttons on the projector or the **Control Stick** on the remote control left/right to reduce the chromatic resolution from the default that is 16.7 million colors to 64.
13. Press the up/down **Arrow** buttons on the projector or move the **Control Stick** on the remote control to select the **Pixels** sub-menu item.
14. Press the left/right **Arrow** buttons on the projector or move the **Control Stick** on the remote control left/right to increase or decrease the number of pixels in the display. Select 800 x 600.
15. Select the menu item **Brightness** and correct the setting so that white areas are projected with maximum intensity.
16. Select the menu item **Contrast** and correct the setting so that the gray areas are clearly visible.
17. Press the **Menu** button to exit the sub-menu and return to the main menu.
18. A message will display in the help window asking you to confirm the changes made in the sub-menu. Press **Enter** to confirm.
19. Press the **Menu** button to exit the main menu display and return to the projected image.

1-11-2. Part 2 – Adjusting the tracking to remove vertical bands in the projection image.

1. Test the tracking using a MS Excel spreadsheet projection image or equivalent. If vertical interference can be seen, then the tracking needs adjustment.
2. Press the **Menu** button on the projector to display the main menu.
3. Press the up/down **Arrow** buttons on the projector or move the **Control Stick** on the remote control up/down to highlight the **Setup** sub-menu.
4. Press the **Enter** button to select the **Setup** sub-menu.
5. Press the up/down **Arrow** buttons on the projector or move the **Control Stick** on the remote control to select the **Tracking** sub-menu item.
6. Press the left/right **Arrow** buttons on the projector or move the **Control Stick** on the remote control left/right to reduce the amount of interference.



7. The direction of adjustment is correct when the number of lines decreases. The setting is optimal when no interference lines can be seen.
8. Press the **Menu** button to exit the sub-menu and return to the main menu.
9. A message will display in the help window asking you to confirm the changes made in the sub-menu. Press **Enter** to confirm.

An automatic setting of tracking can be called up by pressing the **Enter** button. This may not work if the projection image is a uniform pattern.

1-11-3. Part 3 – Adjusting the Sync pixel frequency and scanning frequency.

This adjustment removes any “fuzziness or flicker” in the projection image.

1. Press the **Menu** button on the projector to display the main menu.
2. Press the up/down **Arrow** buttons on the projector or move the **Control Stick** on the remote control up/down to highlight the **Setup** sub-menu.
3. Press the **Enter** button to select the **Setup** sub-menu
4. Confirm your selection by pressing the **Enter** button.
5. Press the up/down **Arrow** buttons on the projector or move the **Control Stick** on the remote control to select the **Sync** sub-menu item.
6. Press the left/right **Arrow** buttons on the projector or move the **Control Stick** on the remote control left/right to reduce the amount of “fuzziness or flicker” in the projection image.

Before



After



An automatic setting of synchronization can be called up by pressing the **Enter** button.

7. Complete fine adjustments to the brightness and contrast settings if minor interference still remains.

Press the **Menu** button to exit the sub-menu and return to the main menu.

8. Complete fine adjustments to the brightness and contrast settings if minor interference still remains.
9. Press the **Menu** button to exit the sub-menu and return to the main menu.
10. A message will display in the help window asking you to confirm the changes made in the sub-menu. Press **Enter** to confirm.
11. Press the **Menu** button to exit the main menu display and return to the projected image.

2. Disassembly/Reassembly

2-1. Overview

Disassembly and reassembly of the MP8620 is done using the reference photographs and the step-by-step procedures that follow. Many component disassembly steps build upon previous disassembly steps. Refer to the previous disassembly steps as needed.

For general machine operation instructions including air filter or lamp replacement, refer to the Operator's Guide.

WARNING

To avoid electrical shocks, unplug projector power cord before performing any maintenance to electrical components.

Caution

To avoid **burns to fingers**, allow projector lamp and internal projector components to cool off prior to lamp removal or disassembly.

2-2. Required Tools

An entire disassembly and reassembly can be completed with the following tools:

- Phillips screwdriver (#1 magnetic long shaft)
- Standard screwdriver (3/16 in. or ¼ in. blade)

2-3. Steps for Removing Projector Components

Removal topics include:

- | | |
|---------------------|---------------------|
| • Top cover | • LCD Assembly |
| • EMI shield | • Lens |
| • Lamp Assembly | • Audio Speakers |
| • Power Supply | • IR Receiver board |
| • Power Distributor | |

Note

If performing a complete disassembly, record lamp time.

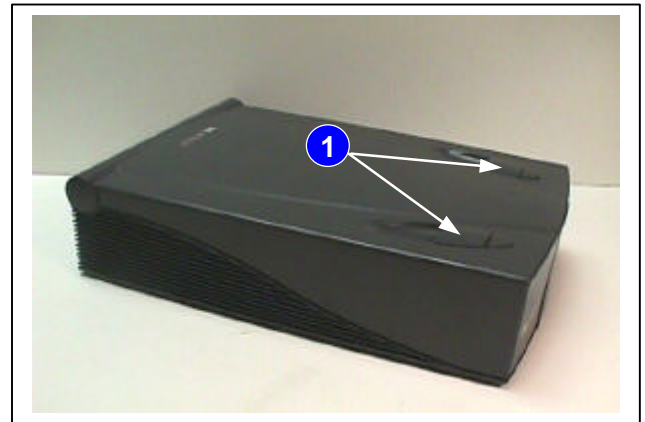
2-3-1. Remove Top Cover**⚠ WARNING**

To avoid electrical shocks, unplug projector power cord before performing any maintenance to electrical components.

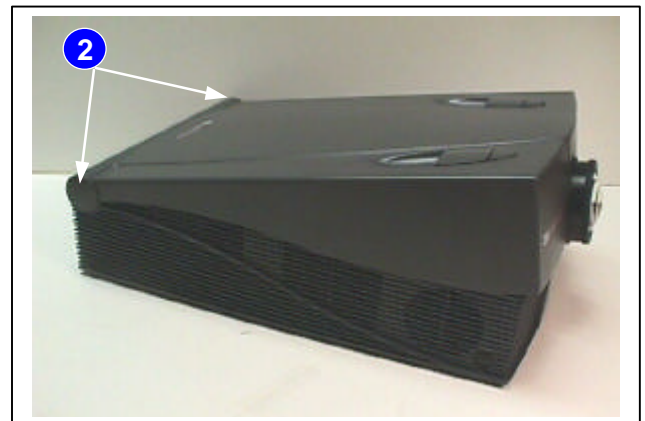
⚠ Caution

To avoid **burns to fingers**, allow projector lamp and internal projector components to cool off prior to lamp removal or disassembly.

1. Lift the two cover latches & lift the cover into the projection position.



2. Carefully pry off two (2) cover hinges.



3. Lift rear of top cover up.
4. Slide top cover forward toward projection lens
5. Reassemble in reverse order.



2-3-2. Remove EMI Shield**⚠ WARNING**

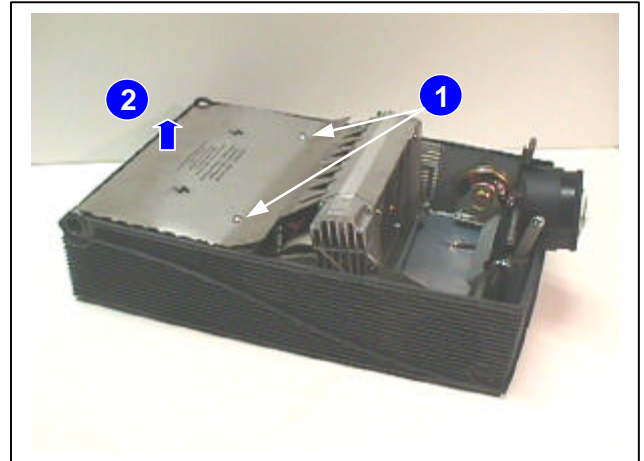
To avoid electrical shocks, unplug projector power cord before performing any maintenance to electrical components.

⚠ Caution

To avoid **burns to fingers**, allow projector lamp and internal projector components to cool off prior to lamp removal or disassembly.

Remove top cover.

1. Remove two (2) screws.
2. Lift EMI shield up to remove.
3. Reassemble in reverse order.



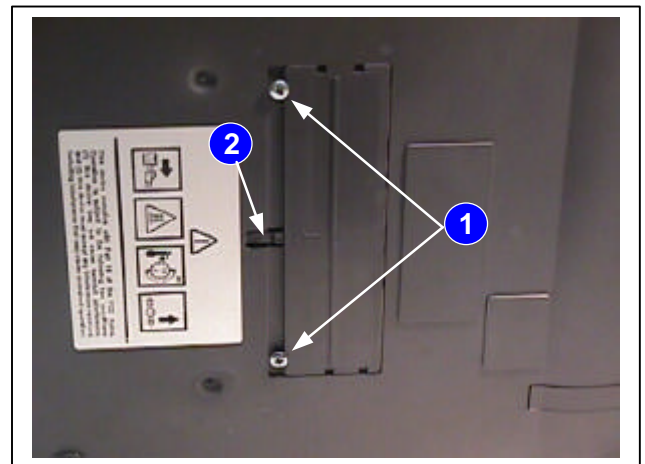
2-3-3. Remove Lamp Assembly**⚠ WARNING**

To avoid **electrical shocks**, unplug projector power cord before performing any maintenance to electrical components.

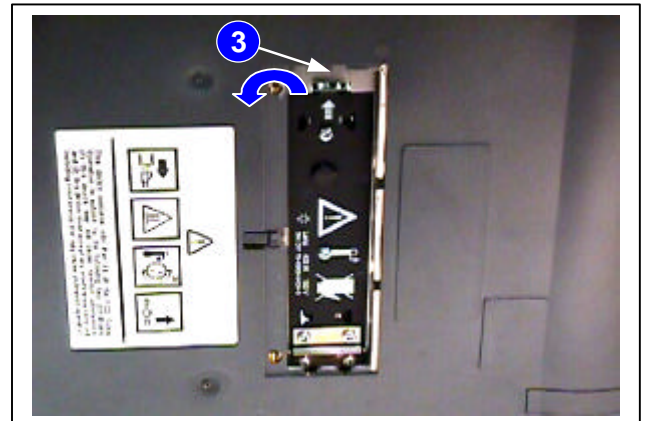
⚠ Caution

To avoid **burns to fingers**, allow projector lamp and internal projector components to cool off prior to lamp removal or disassembly.

1. Remove two (2) screws from bottom of base.
2. Depress lock tab and slide cover to remove.

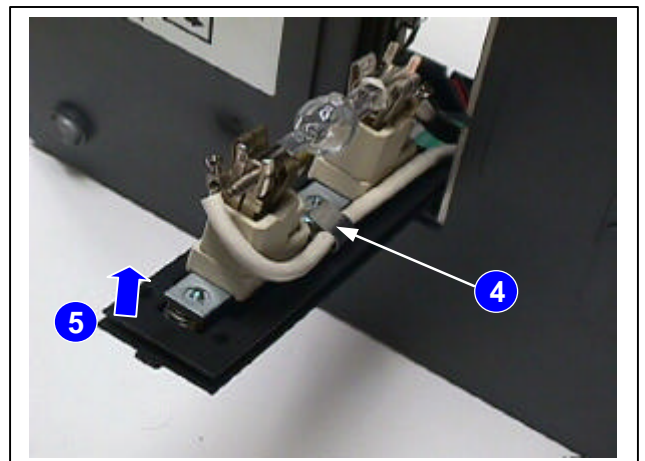


3. Lift latch to release lamp panel and lower panel to the open position.

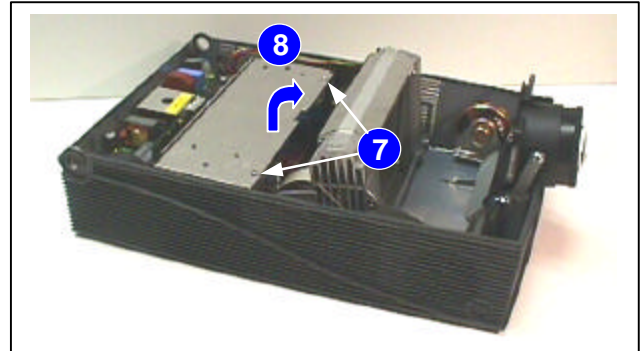
**√ Note**

Do not touch lamp glass with fingers. Oil from fingers can reduce lamp life.

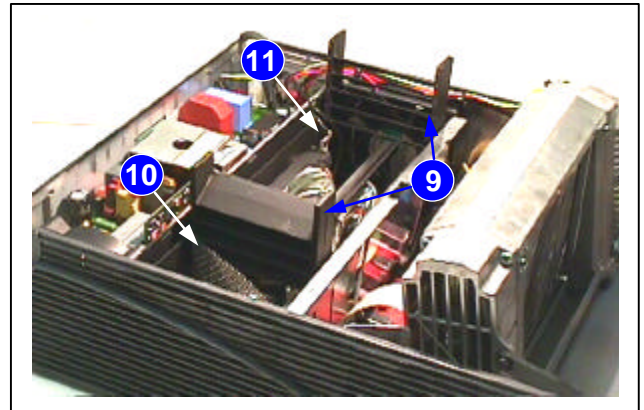
4. Release wire from wire holder.
5. Return lamp panel to the closed position.
6. Remove EMI shield. (See Section 2-3-2.)



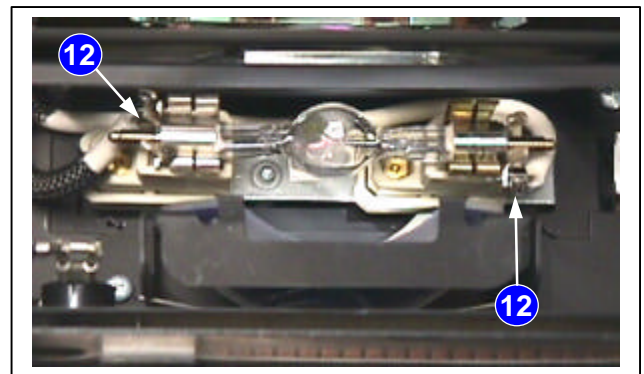
7. Remove two (2) screws securing lamp housing cover.
8. Lift the front of the lamp housing cover up then slide it forward to remove.



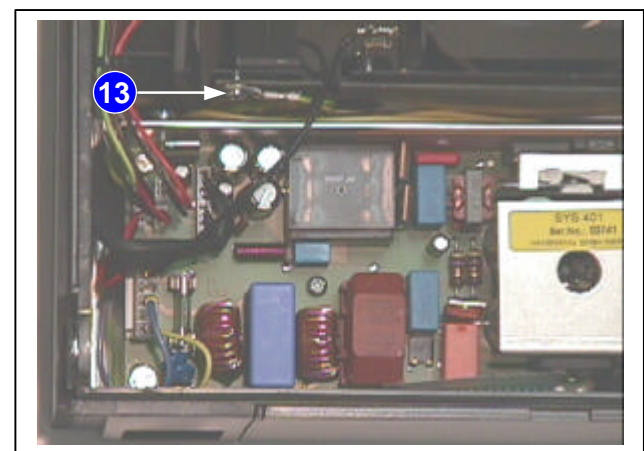
9. Remove the IR filter. Notice the position of the filter for reassembly. The fins point downward and out.
10. Remove light shield by pulling it up and out.
11. Disconnect two (2) wire connectors from the thermostat.



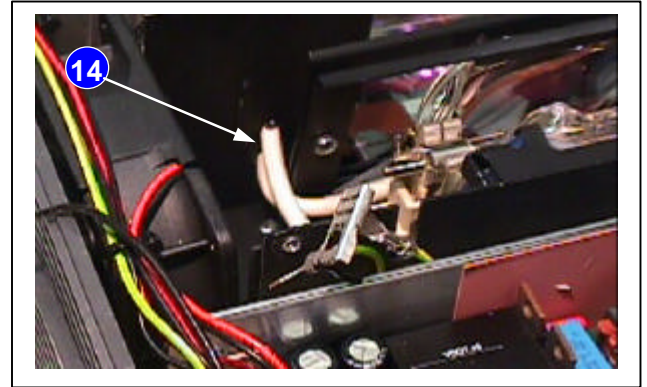
12. Loosen two (2) screws on the white lamp leads and carefully disconnect wires.



13. Remove one (1) screw to disconnect two (2) ground wires.

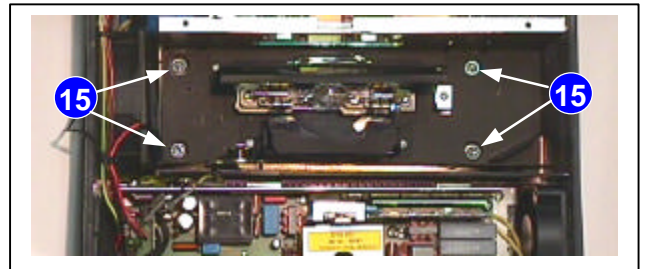


14. Feed lamp wire leads through front of lamp housing.



15. Remove four (4) Torx head screws to free lamp assembly. Carefully lift lamp assembly out of projector body.

16. Reassemble in reverse order.



2-3-4. Remove Power Supply**⚠ WARNING**

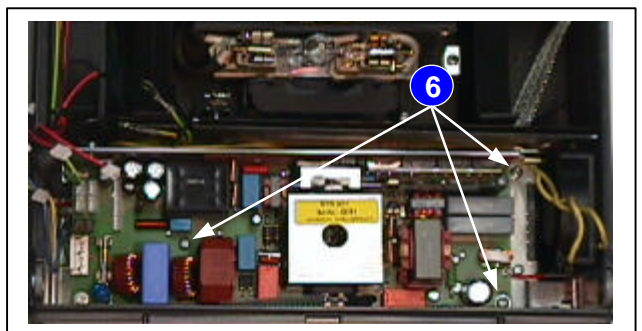
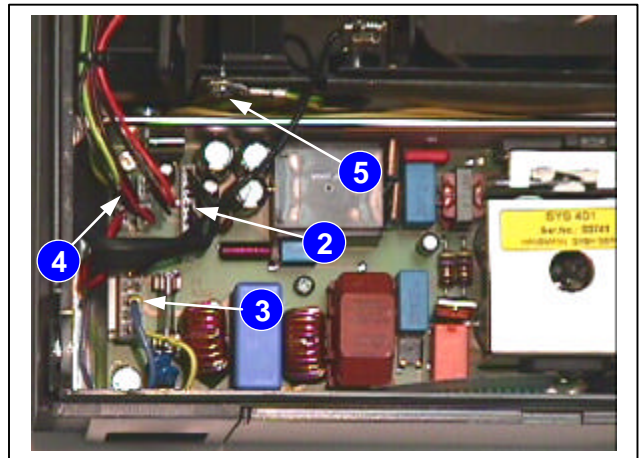
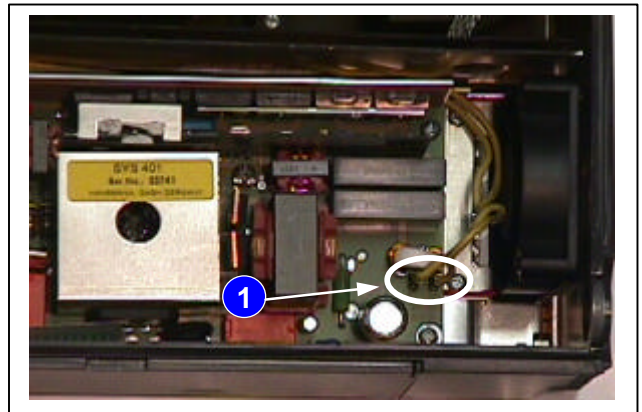
To avoid electrical shocks, unplug projector power cord before performing any maintenance to electrical components.

⚠ Caution

To avoid **burns to fingers**, allow projector lamp and internal projector components to cool off prior to lamp removal or disassembly.

Remove the EMI shield.

1. Remove the lamp wire leads from the power supply board at the fan end. These leads connect to the lamp ignitor.
2. Disconnect the ten-pin PCB Interface connector.
3. Disconnect the three-pin power connector.
4. Disconnect all fan cables (four (4) connectors in a block) that are opposite the cooling fan. These cables are connected in parallel and do not need to be reconnected in the exact same connector.
5. Remove one (1) screw to release two ground wires.
6. Remove three (3) phillips screws to release power supply.
7. Reassemble in reverse order.



2-3-5. Remove Power Distributor**⚠ WARNING**

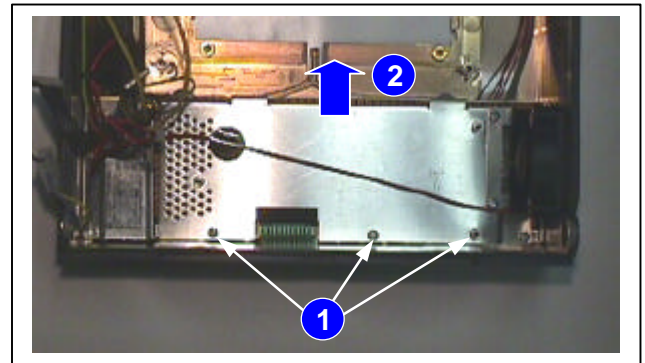
To avoid electrical shocks, unplug projector power cord before performing any maintenance to electrical components.

⚠ Caution

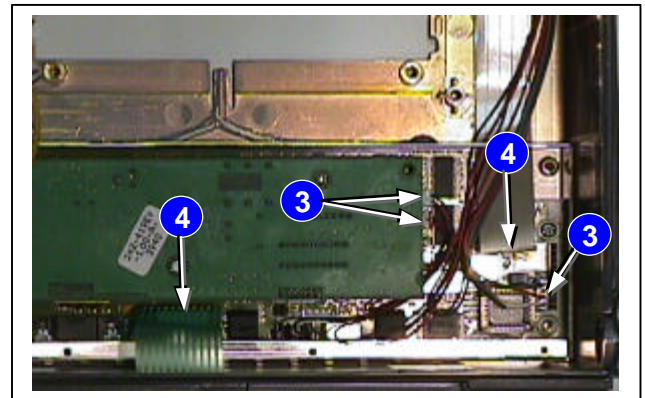
To avoid **burns to fingers**, allow projector lamp and internal projector components to cool off prior to lamp removal or disassembly.

Remove lamp assembly and power supply.

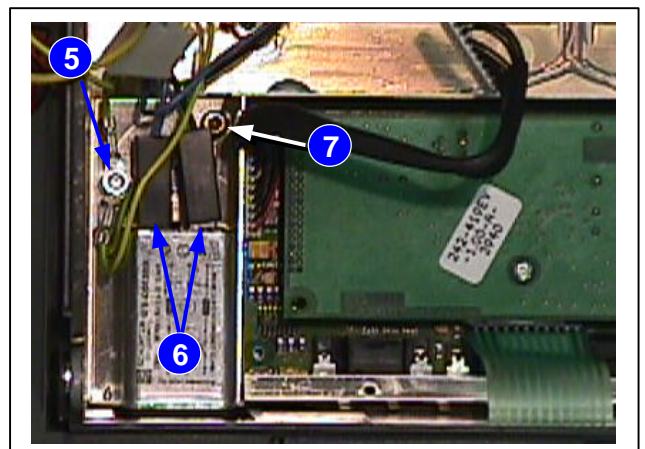
1. Remove three (3) screws securing cover.
2. Lift edge of cover toward front of machine first and then remove.



3. Disconnect three (3) cable connectors.
4. Disconnect two (2) ribbon cables.



5. Remove one (1) screw to disconnect ground.
6. Disconnect two (2) ribbon cables.
7. Remove two (2) screws (one on each side).
8. Remove power distributor.
9. Reassemble in reverse order.



2-3-6. Remove LCD Assembly**⚠ WARNING**

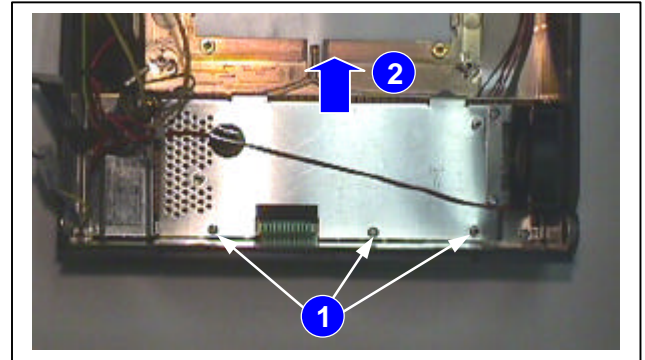
To avoid electrical shocks, unplug projector power cord before performing any maintenance to electrical components.

⚠ Caution

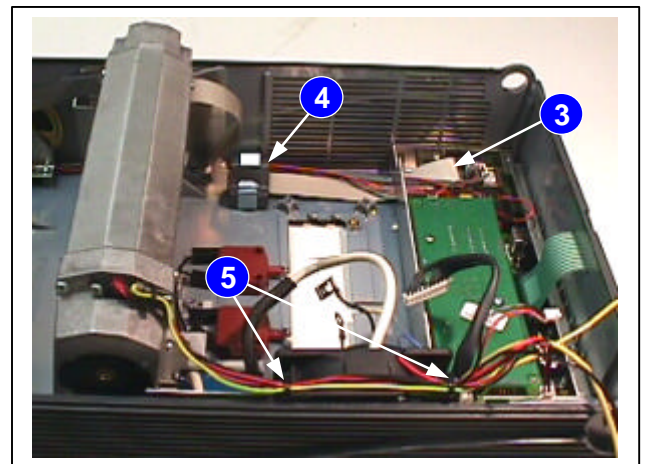
To avoid **burns to fingers**, allow projector lamp and internal projector components to cool off prior to lamp removal or disassembly.

Remove the lamp and the power supply.

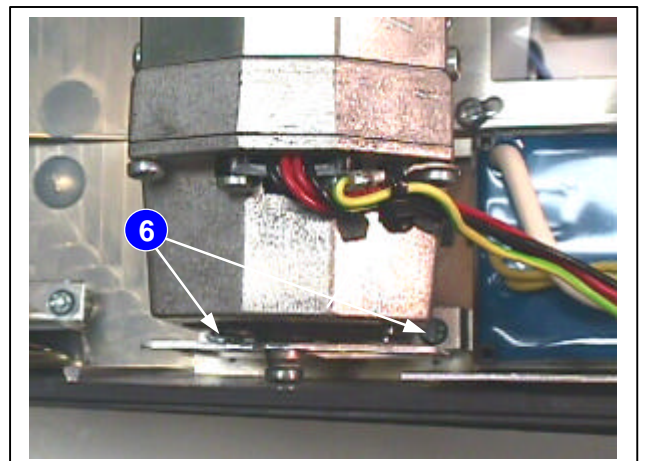
1. Remove three (3) screws securing cover.
2. Lift edge of cover toward front of machine first and then remove.



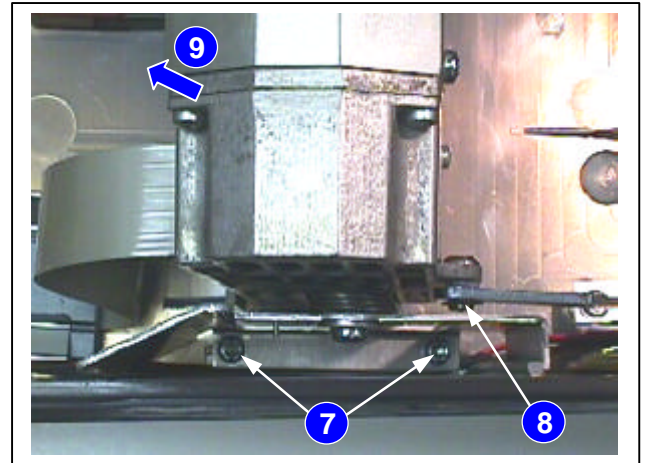
3. Disconnect LCD ribbon cable.
4. Feed LCD ribbon cable through EMI ferrite.
5. Remove two (2) cable ties.



6. Remove two (2) screws from left side LCD assembly bracket.



7. Remove two (2) screws from right side LCD assembly pivot bracket.
8. Remove one (1) e-ring.
9. Remove LCD assembly.
10. Reassemble in reverse order.



2-3-7. Remove Lens

⚠ WARNING

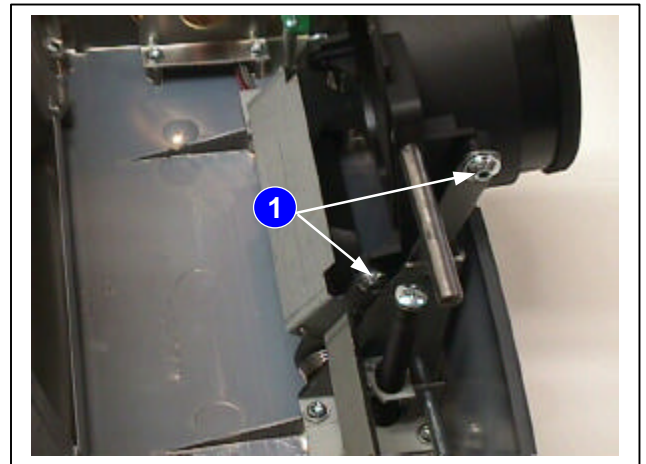
To avoid **electrical shocks**, unplug projector power cord before performing any maintenance to electrical components.

⚠ Caution

To avoid **burns to fingers**, allow projector lamp and internal projector components to cool off prior to lamp removal or disassembly.

Remove the top cover.

1. Remove four (4) screws (two on each side) to release the lens.
2. Reassemble in reverse order.



2-3-8. Remove Audio Speakers**⚠ WARNING**

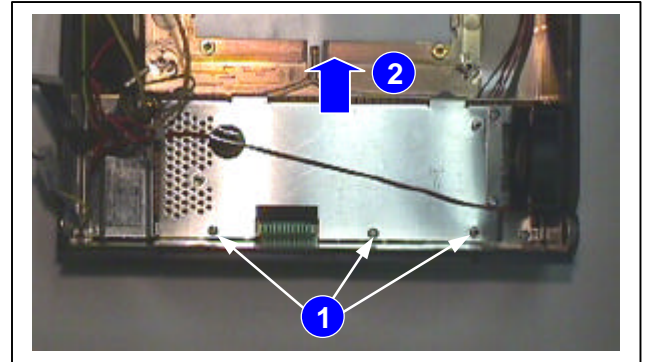
To avoid electrical shocks, unplug projector power cord before performing any maintenance to electrical components.

⚠ Caution

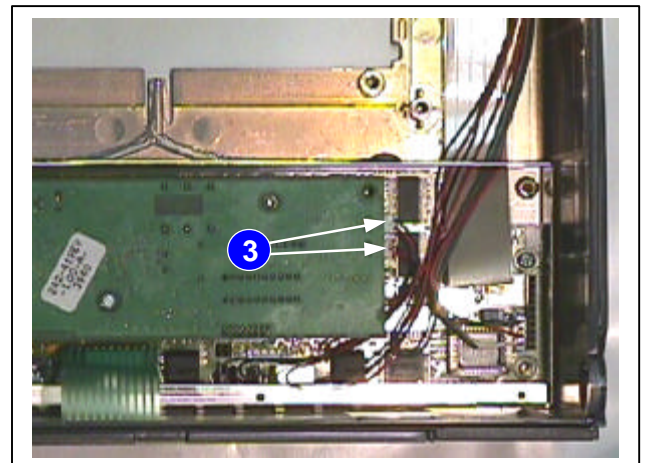
To avoid **burns to fingers**, allow projector lamp and internal projector components to cool off prior to lamp removal or disassembly.

Remove the lamp assembly and power supply.

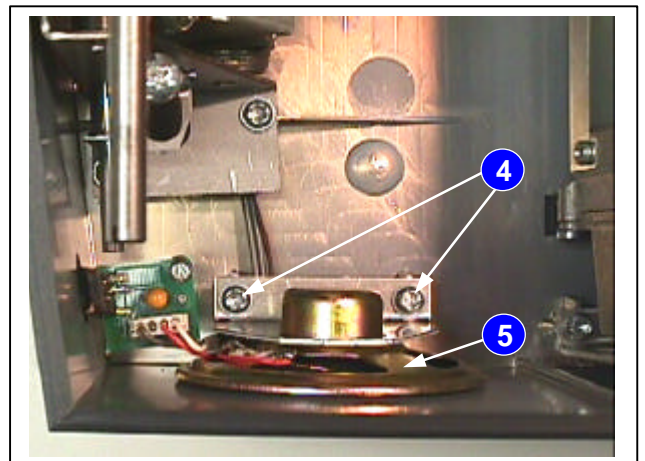
1. Remove three (3) screws securing cover.
2. Lift edge of cover toward front of machine first and then remove.



3. Disconnect two (2) cable connectors.



4. Remove four (4) screws (two on each side) from left and right speaker brackets.
5. Remove speakers.
6. Reassemble in reverse order.



2-3-9. Remove IR Receiver Board**⚠ WARNING**

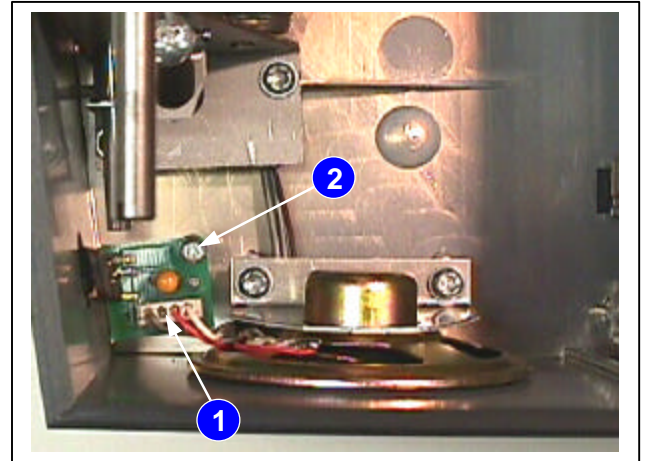
To avoid electrical shocks, unplug projector power cord before performing any maintenance to electrical components.

⚠ Caution

To avoid **burns to fingers**, allow projector lamp and internal projector components to cool off prior to lamp removal or disassembly.

Remove the top cover.

1. Disconnect one (1) cable connector.
2. Remove one (1) screw from IR receiver board.
3. Remove IR receiver board.
4. Reassemble in reverse order.



3. Troubleshooting

3-1. Overview

Troubleshooting is necessary to isolate problems with the MP8620. This section contains troubleshooting flow charts and a general problems section.

3-2. Section Contents

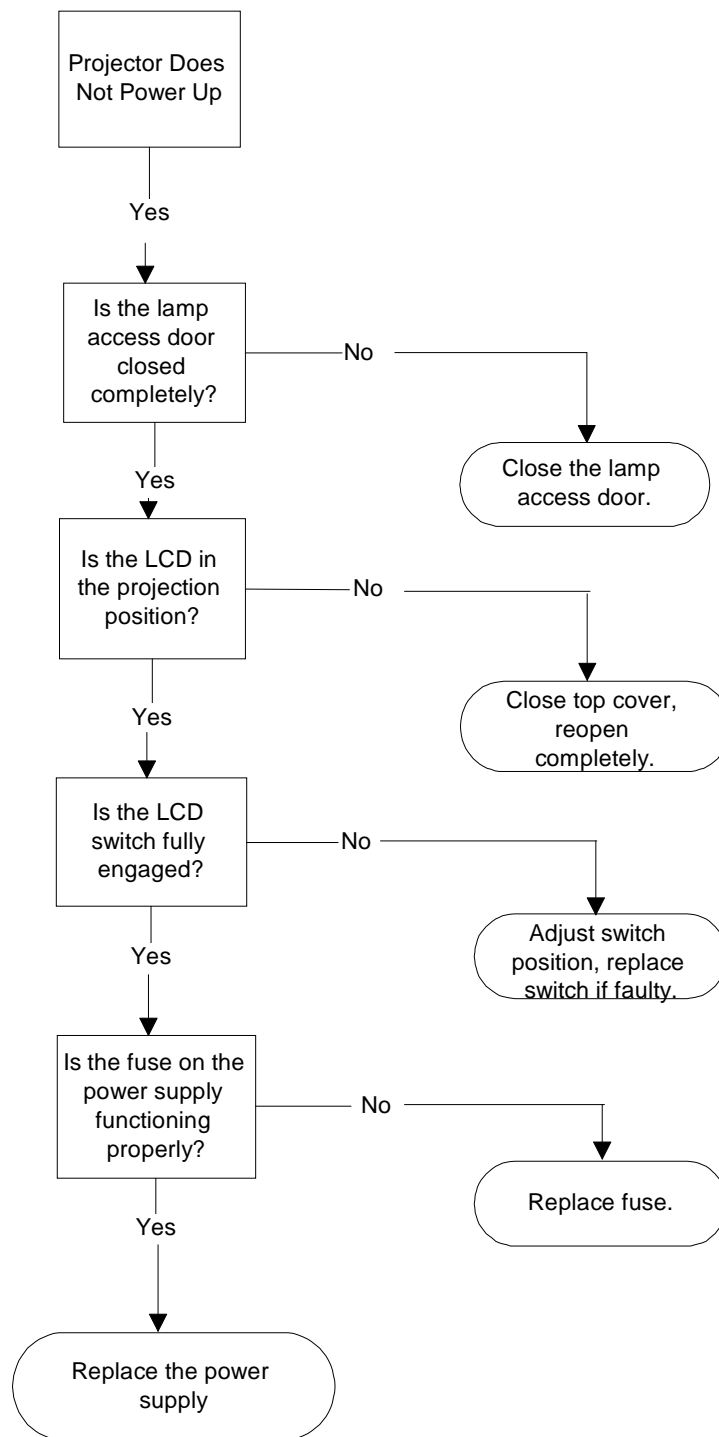
- Direct Failure Troubleshooting Flow Charts
- General/Projection Image Troubleshooting

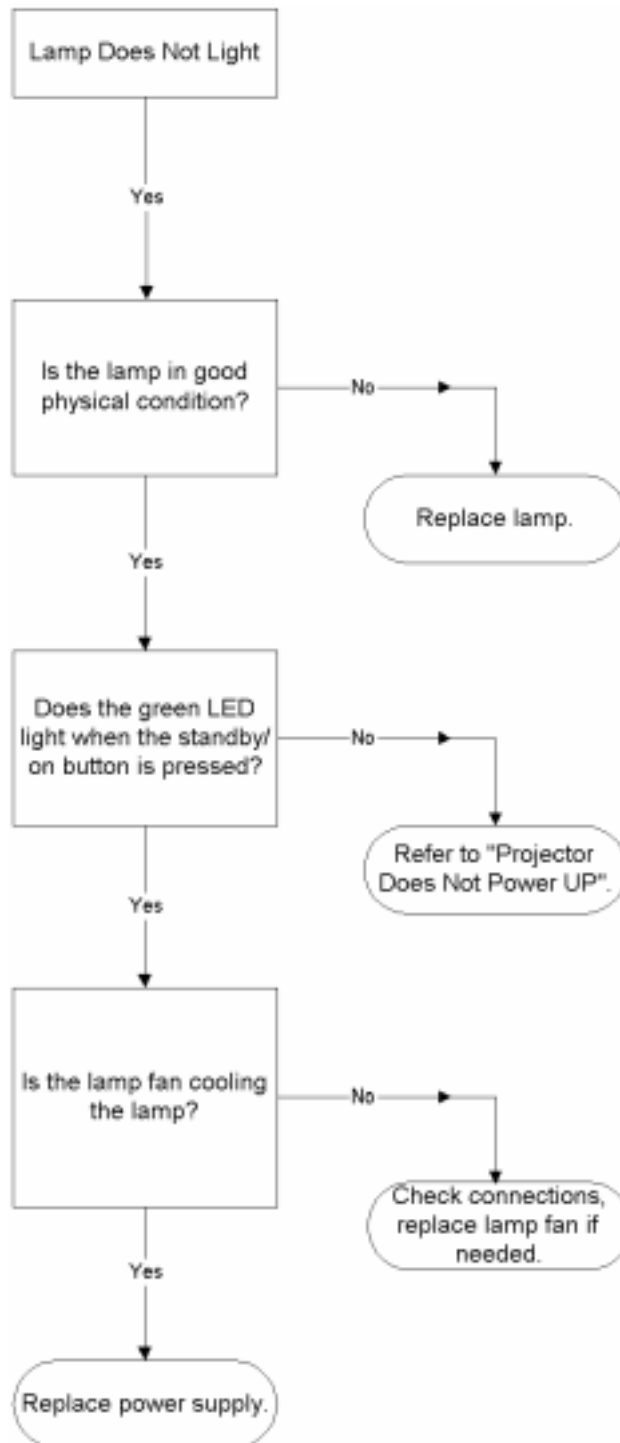
3-3. Direct Failure Troubleshooting Flow Charts

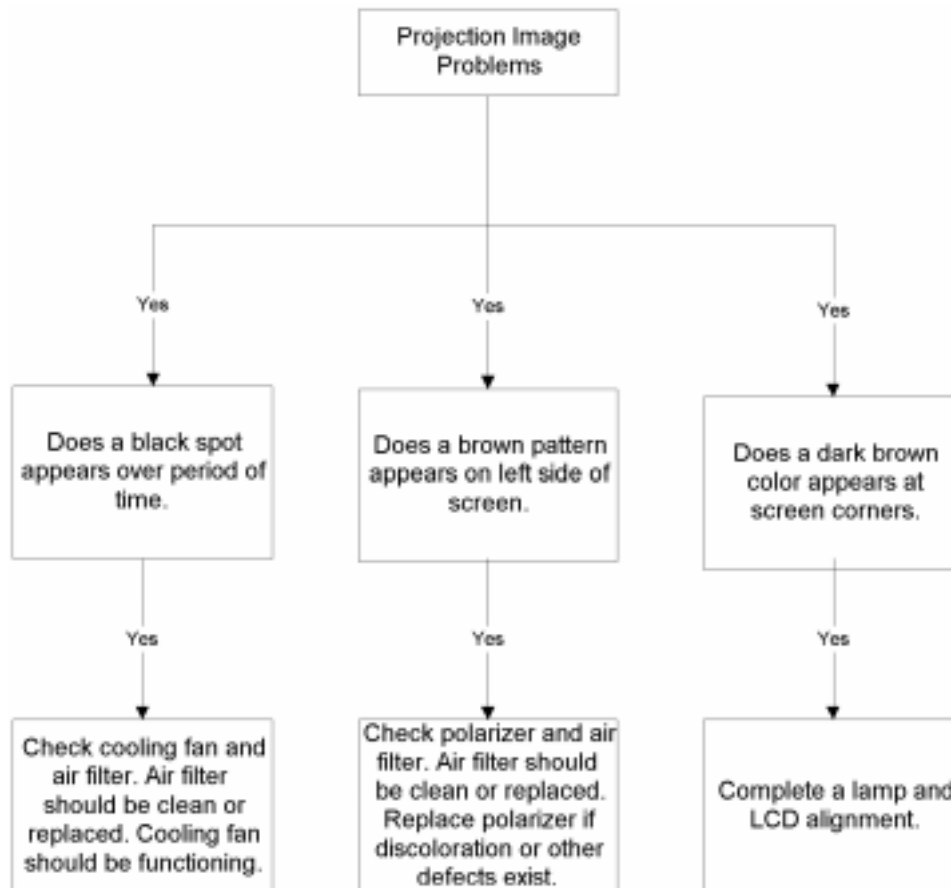
The troubleshooting flow charts listed in this section start with the basics and move forward. They are designed to be used for solving direct failure problems.

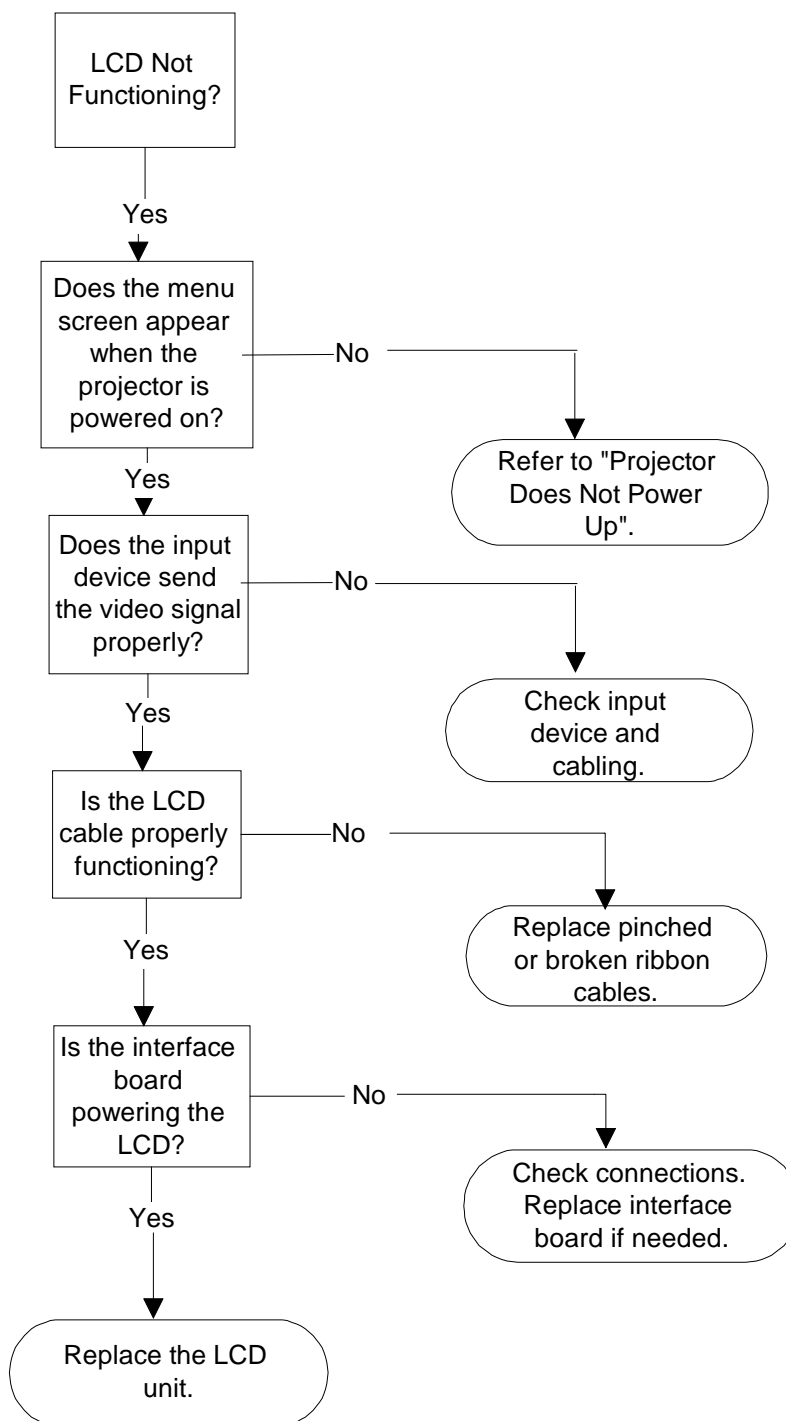
The following problems can be resolved using the troubleshooting flow charts:

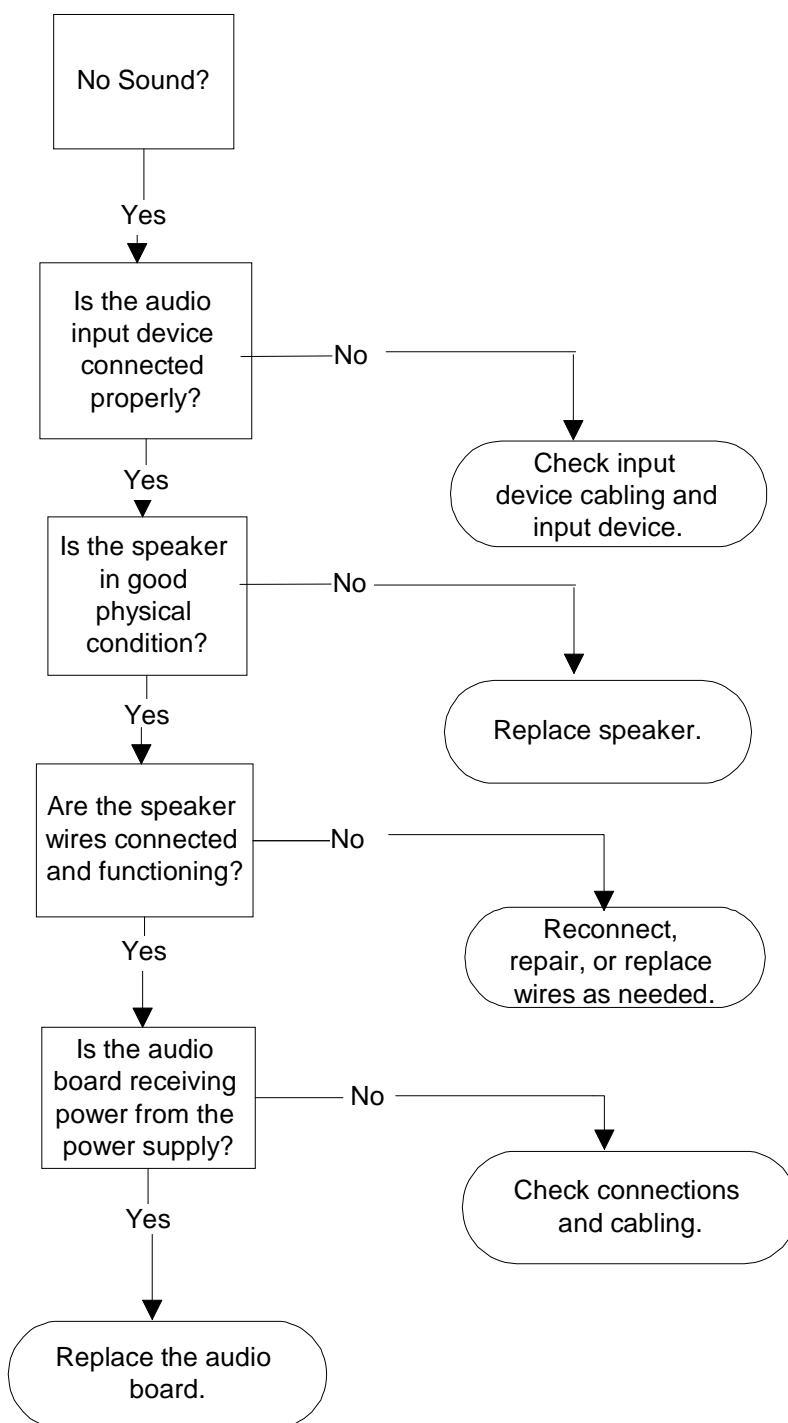
- Projector Does Not Power Up
- Lamp Does Not Light
- Projection Image Problems
- LCD Not Functioning
- No Sound

3-3-1. Projector Does Not Power Up

3-3-2. Lamp Does Not Light

3-3-3. Projector Image Problem

3-3-4. LCD Not Functioning

3-3-5. No Sound

3-4. General/Projection Image Troubleshooting

Past experience has shown the following problems are most common:

3-4-1. Image is Disturbed or Unstable

Probable causes are:

- Wrong sync setting
- Wrong tracking value

Possible solutions are:

- Set to factory default setting (refer to Appendix C-2).
- Change Sync setting in the Setup menu for optimum performance.
- For vertical interference stripes, change the Tracking in the Setup menu for optimum performance.

3-4-2. No Computer Image Projected

Message No input detected is shown.

Probable causes are:

- Loose cable.
- No power to computer.
- Wrong synchronization mode.

Possible solutions are:

- Check and secure cable connections.
- Turn on computer.
- Adjust synchronization mode of the projector to the synchronization mode of the computer via Option menu.

3-4-3. No Video Image Projected

Probable causes are:

- No signal from video source.
- Check and secure cable connections.
- Check video picture on TV.

Possible solutions are:

- Check and secure cable connections.
- For PS/2 and ADB (Apple) mouse, a special adapter is necessary.
- Only use adapters from the original manufacturer.

3-4-4. Mouse Does Not Work

Probable causes are:

- Loose cable.
- Wrong connection.
- Wrong power up sequence.

Possible solutions are:

- The mouse emulation operates correctly only if the correct power up sequence has been used.
-

3-4-5. Image Off Center

Probable causes are:

- Image position
 - Center image with the arrow keys of the control panel or the disc pad on the remote control.
 - If vertical interference stripes occur, change the Tracking value in the Setup menu for optimum performance.
-

3-4-6. Cannot Get Entire Image on the Screen

Probable causes are:

- Wrong Tracking value.
- Compatibility problem.
- Wrong pixel setting.

Possible solutions are:

- Refer to the documentation of your graphic card.
 - The projector supports the resolutions that can be found under Pixel in the Setup menu.
 - Adjust the Pixel setting in the Setup menu to the resolution of the video mode output from the computer graphic card.
-

3-4-7. Washed Out Image

Probable causes are:

- Wrong Contrast setting.
- Wrong Brightness setting.

Possible solutions are:

- Change Contrast setting in the Setup menu. The bar should be in the middle position.
- Lower Brightness setting in the Setup menu. Choosing Brightness and pressing Enter performs an automatic adjustment.

3-4-8. Humming Noise. Slowly Passing Horizontal Bars

Probable causes are:

- Signal sources are connected to different power sources.
- VCR connected to aerial system and to projector.
- Bad signal.

Possible solutions are:

- Locate the source of disturbance. Disconnect the sources one after another from the projector. Connect all sources to a common power source.
- Remove antenna connection from VCR. If the disturbance disappears, use a bypass filter (isolating transformer) to connect the antenna to the VCR.
- Try different input source.

3-4-9. No Power. Power Shuts Off During Presentation

Probable causes are:

- Power switch OFF.
- Projector overheated.

Possible solutions are:

- Turn on Power switch to projector.
- Remove any objects blocking ventilation and allow projector to cool down. Power will return and projector will be in Standby mode.

MP8620 Message Table

	Indicator status	Meaning	Remedy
ON indicator	Lights orange	Standby mode	normal
	Blinks green	During warming up	normal
	Lights green	During operation	normal
	Blinks orange	During cooling down	normal
LAMP indicator	Lights red	Lamp cannot light	Cool projector by power off for 20 minutes.
	Blinks red	Air filter open	Ensure filter is closed.
TEMP indicator	Lights red	Temperature inside too high	Let projector cool 20 minutes. Check air flow and filter.
	Blinks red	Cooling fan not operating	call your dealer

4. Theory and Diagrams

4-1. Overview

In order to truly understand what is taking place when making advanced projector adjustments, the following concepts must be introduced and explained. An understanding of these principles increases your efficiency when making advanced projector adjustments. The diagrams in this section assist you in finding the pin locations, connectors and wiring during troubleshooting.

4-2. Theory of Operation

Use the projector circuitry diagrams as a reference when reading the topics in this section.

4-2-1. Power Supply Circuit

When the main power switch is on and the 110V AC power is supplied, two DC power circuits are energized. The AC power passes through a filter then on to the ballast where the AC voltage changes to DC voltage and is split. High voltage DC current is sent to the lamp where it will have six tries to light. Low voltage DC current is sent to the power unit circuit then to the Micro processor to power the rest of the projector.

4-2-2. Video Input and AD Conversion

There are two sets of video inputs. Switching between them is done using the input button on the top of the projector or the Video1/2 button on the remote control.

Signal Board

The video signal passes through the video signal selector then to the comb filter where it is split into the chroma signal (C). It is then sent to the RGB/video selector and the luminance (Y) signal is sent to the sync selector.

Driver Board

The signal passes through another selector before the AD converter. The analog signal is changed to a digital signal and passes through the on screen display. The gate array is where a smoothing affect and resizing takes place. The signal is then changed back to analog and sent to the video amplifier/inversion amplifier. The luminance signal (Y) information passes through the gate array and timing generator. A PLL circuit generates the sampling pulse for the AD converter and is dependent upon the detection of vertical and horizontal sync pulses. The two signals are output through the video amplifier, where the sample/hold and video rotation take place before each LCD receives the appropriate information.

4-2-3. RGB Input and AD Conversion

There are two sets of RGB inputs. Switching between them is done using the input button on the top of the projector or the RGB1/2 button on the remote control.

Signal Board

The RGB signal goes through a RGB1/2 signal selector then the chroma signal (C) information is sent to the video/RGB selector and the luminal signal (Y) information is sent to sync selection.

Driver Board

Refer to driver board information for video.

RGB Out

RGB out simply takes the information in its analog state and passes it through an amplifier to the terminal out.

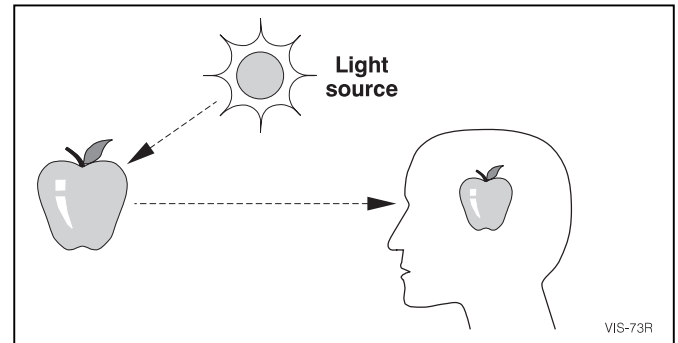
Additional electronic image smoothing occurs in the gate array of the MP8610.

4-3. Color Theory

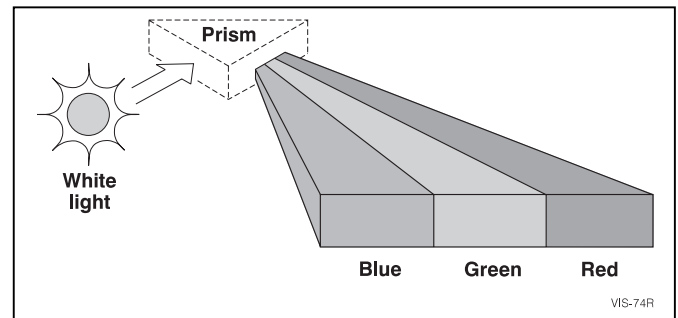
An understanding of color theory provides a background for making the convergence and white balance adjustments discussed in Section 6.

4-3-1. Color

Color is a visual sensation that involves three elements— a light source, an object, and a viewer. Light is reflected and modified by an object, then reaches the receptors in our eyes and is interpreted by our brains into what we know as color.

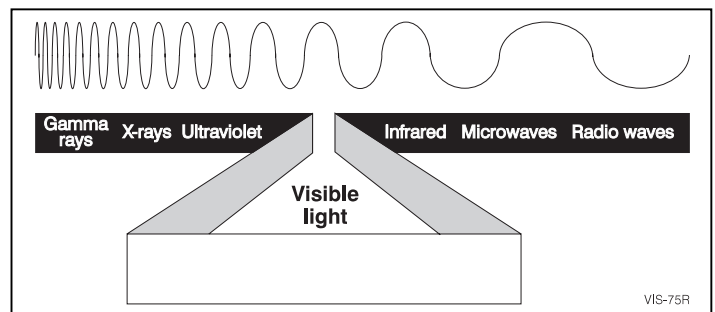


Each color has its own measurable wavelength or combination of wavelengths. The wavelengths of light are not colored, but produce the sensation of color.



4-3-2. Electromagnetic Spectrum

All wavelengths of light are part of the electromagnetic energy spectrum. The spectrum is a continuous sequence of energy waves that vary in length from short to long. Visible light, the wavelength that our eyes can detect, is only a small portion of the entire spectrum. At one end of the visible spectrum are the short wavelengths of light we perceive as blue. At the other end of the visible spectrum are the longer wavelengths of light we perceive as red. All other colors are found somewhere along the spectrum between blue and red.



4-4. LCD Structure Theory

An understanding of LCD Structure theory provides a background for making the convergence adjustments discussed in section 6.

LCD is the acronym for Liquid Crystal Display. The three LCD panels (Red, Green, Blue) in the MP8610 are a 1.3" square, poly-silicon design. Each LCD panel is composed of a layer of liquid crystal cells, electrodes, and glass.

4-4-1. LCD Cells

Each cell is composed of long, rod shaped molecules that react to an electrical charge. In their normal state, the molecules form a spiral. When an electrical charge is applied, the molecules align themselves allowing the light to pass through the pixels. Shades of gray are obtained by inputting voltages that fall between full off (no voltage) and full on (full voltage). The cells are refreshed at the speed of 1/60th of a second and are sensitive to high temperatures.

4-4-2. How Light Passes Through An LCD

Polarized light entering the cells from the rear is aligned so that it will pass the light through the polarizer on the other side. Patterned transparent electrodes on the inner surfaces of the glass form an addressing system that creates a distinct electric field for each pixel. The light that was not aligned as it passed through the liquid crystal cell is blocked.

4-4-3. Example Projection

If 100% of the red light is emitted through the red LCD panel and 50% of the green light makes it through the green LCD panel and the blue light is blocked entirely, a light brown screen is projected.

4-5. Lamp Theory

The MP8620 with a DC 400 watt metal halide bulb is capable of producing 450+ lumens of uniform brightness across the entire projection image.

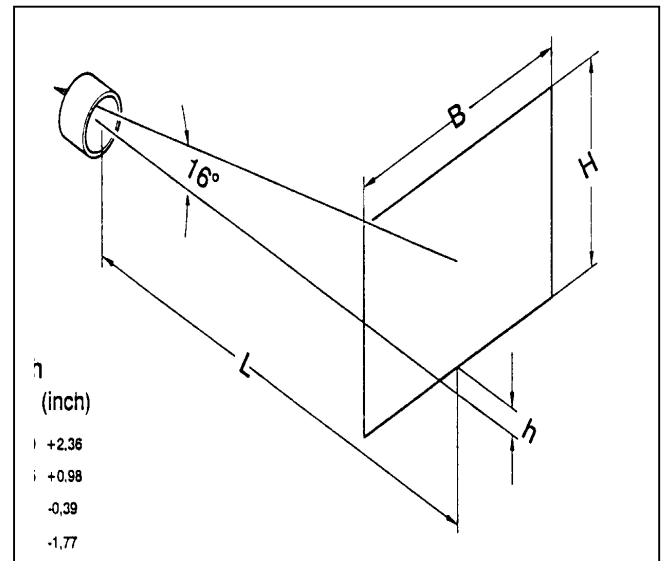
The metal halide bulbs should never be touched. When oil from your skin touches the bulb, it provides a focal point for the lamp energy. The lamp burns hotter at that location and eventually burns through the bulb prematurely.

4-6. Keystone Correction

A correct projection image on the MP8620 should be square and in focus. A projection image that is wider at the top and has a softened focus has keystoneing.

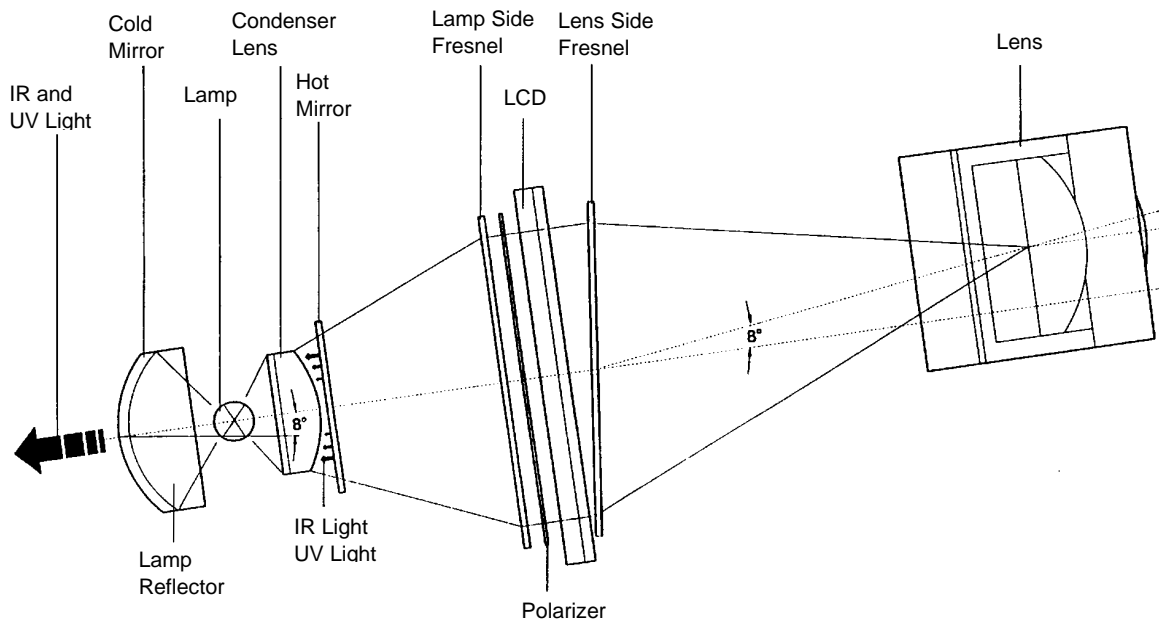
Keystoneing is visible on the MP8620 when the projection to screen angle is greater than sixteen degrees. As the front of the projector is raised the projection angle increases. At sixteen degrees the projection image is still square and in focus, at nineteen degrees keystoneing can be seen.

The MP8620 is keystone corrected at a ratio of 3.9 to 1 to provide a square focused image as shown. Restated, for every 3.9 feet of projection distance the image is raised 1 foot. This feature allows for 80% of the projection image to appear above the lens center with only 20% appearing below.



4-7. Optical System Layout

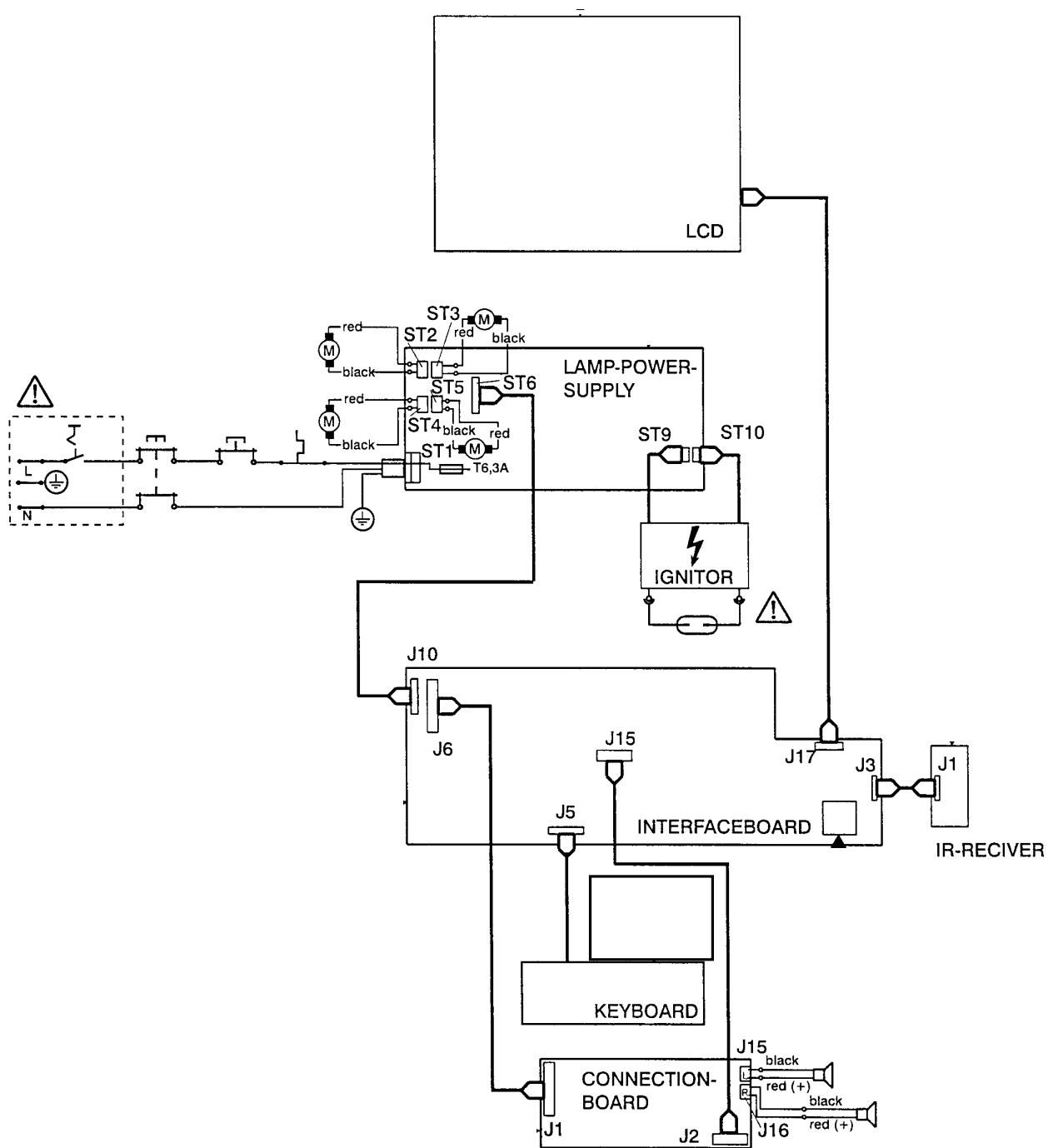
Notice that the optics module is composed of a lamp, a fresnel lens, and an LCD panel.



Lamp	Projects light.
Fresnel Lens	Magnifies the projection image.
Polarizer	Allows light waves, at the right angle, to pass through
Hot Mirror	Heat management device that passes the light and reflects heat, IR and UV light.
Cold Mirror Reflector	Heat management device that reflects the light and passes heat, IR and UV light.
LCD Panel	Positions the liquid crystal cells that form an image.

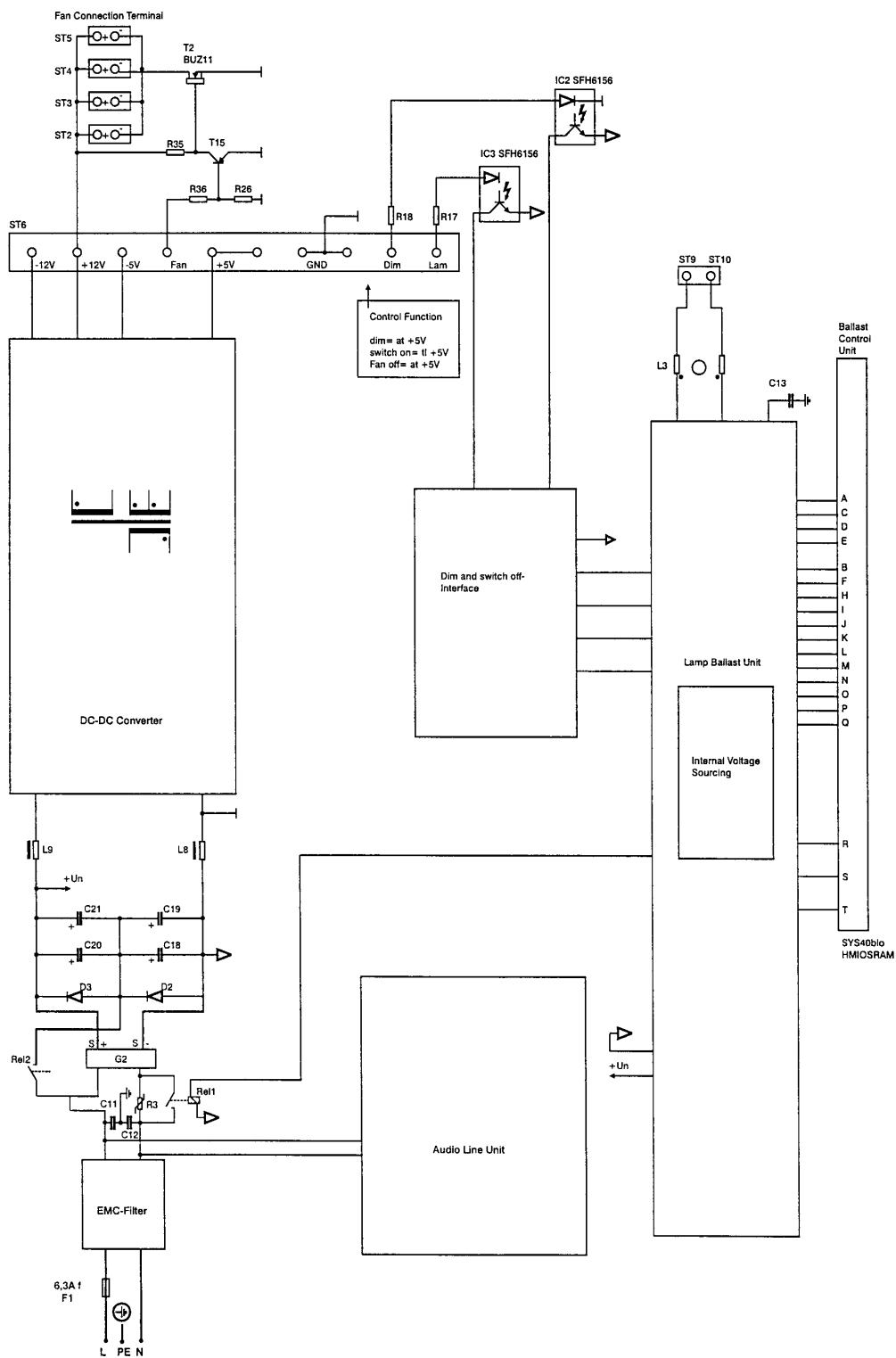
4-8. Connection Diagrams

Electrical diagrams provide a visual representation of how the projector circuitry is connected.



4-9. Wiring Diagrams

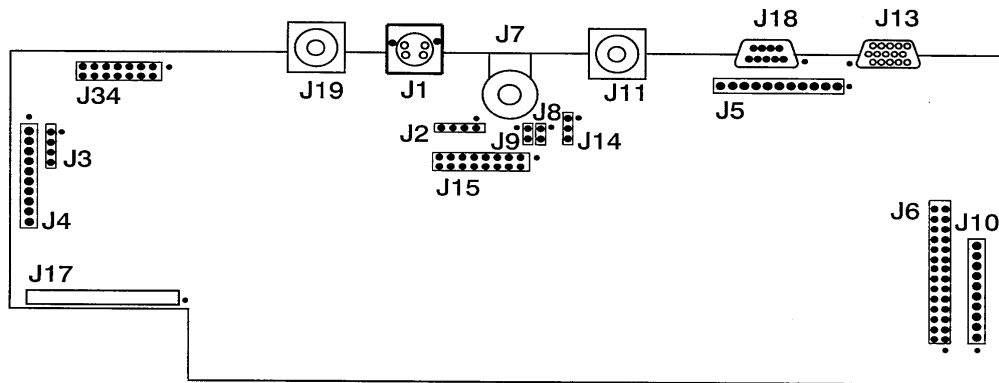
Wiring diagrams provide a visual representation of how the projector is wired.



4-10. Internal Cabling Pinout Tables

The pinout tables listed in this section are designed to assist in solving internal cable failure problems.

4-10-1. Interface Board Connector Locations

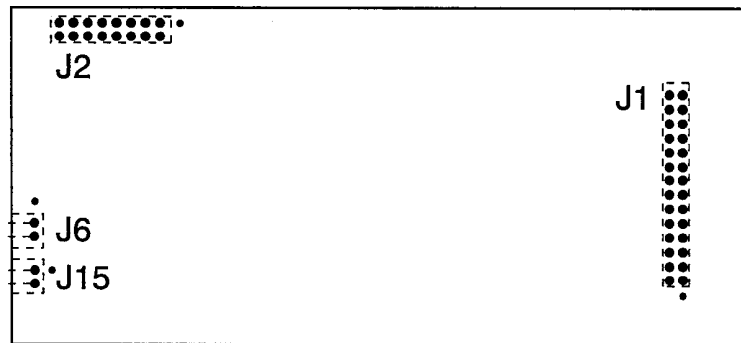


Power Supply Connector (J10)

Pin 1 of the connector is the black cable and pin 10 of the connector is the red cable.

1-2	5 Volt
3	-5 Volt
4	+12 Volt
5	-12 Volt
6-7	Ground
8	Lamp on = 5Volt (TTL high) Lamp off = 0 Volt (TTL Low)
9	Dimmer Standard = 0 Volt (TTL low) Economy = 5 Volt
10	Fan on= 5Volt (TTL high) Fan off = 0 Volts(TTL low)

4-10-2. Audio Board Connector Locations



Video Out (J1)

This connector joins the audio and interface boards.

Video In (J2)

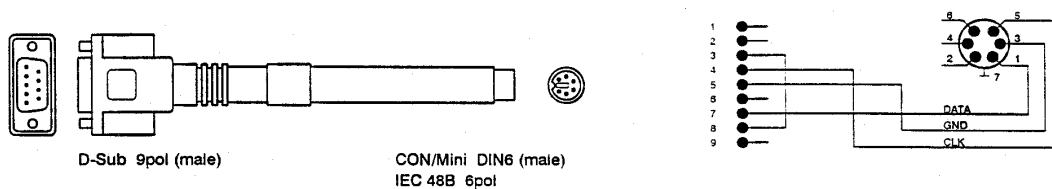
Allows for video input from the interface board to the audio board.

Pin	Belegung	Pin	Belegung	Pin	Belegung
1	BAS	7	SL2	12	GND
2	GND	8	GND	13	SR1
3	VIDEOIN	9	SR2	14	GND
4	GND	10	GND	15	SDA
5	CHR	11	SL1	16	SCL
6	GND				

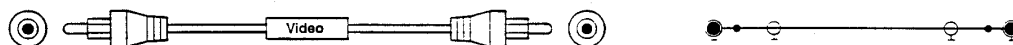
4-11. Computer/Video/Audio Connections

The information provided in this section is for reference purposes. Each type of cable is shown with a pinout diagram.

6 Adapter PS/2 Maus



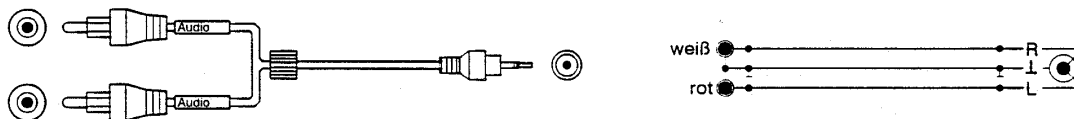
31 Cinch - Cinch



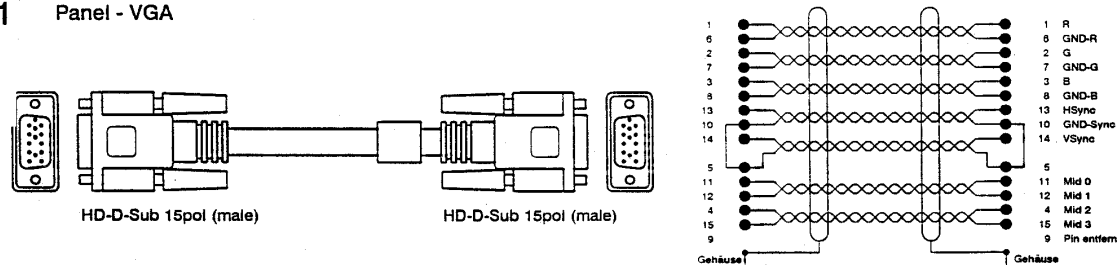
32 DIN 4pol mini - DIN 4pol mini



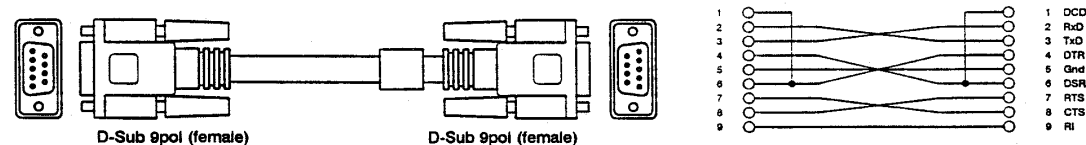
33 Chinch - 3,5



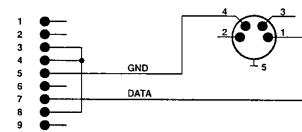
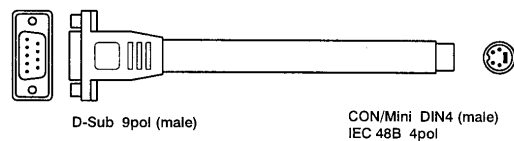
41 Panel - VGA



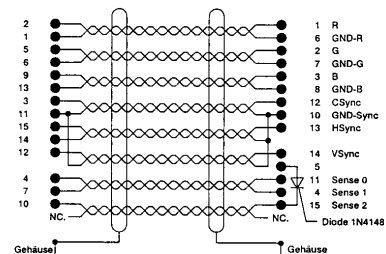
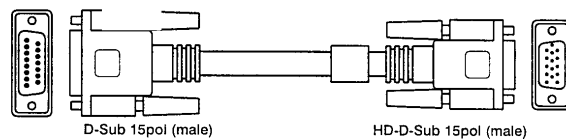
42 Panel - Maus



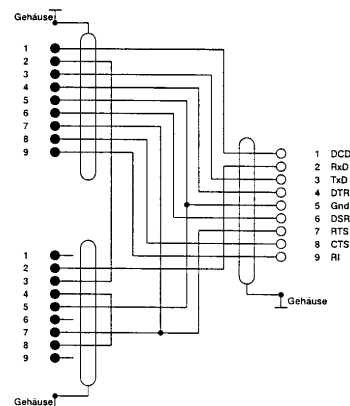
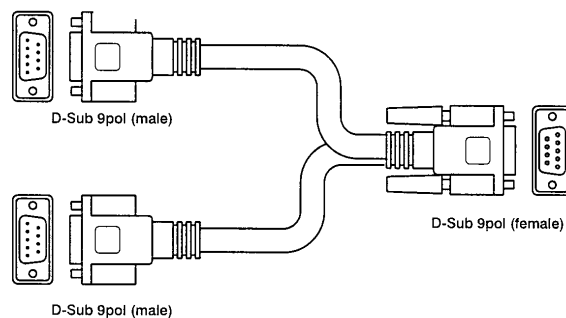
51 Adapter MAC Ma



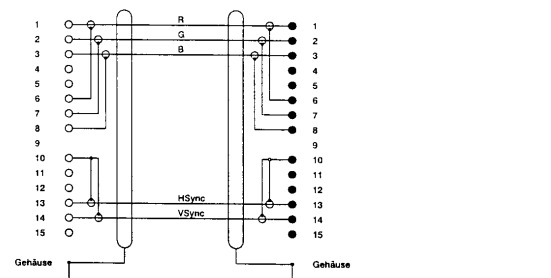
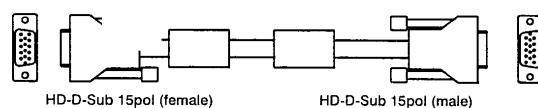
52 Panel - MAC



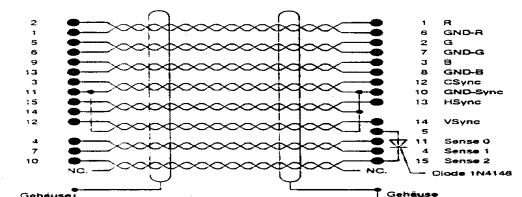
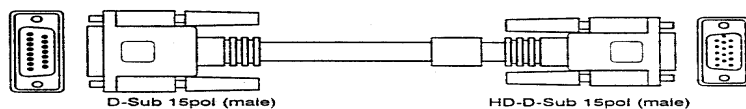
70 Adapter Mouse seriell



84 Booster - Empfänger



52 Panel - MAC

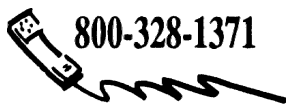


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